

## A New Record of *Vanessa virginiensis* "ab. *ahwashtee*" from Northern California (Lepidoptera: Nymphalidae)

Arthur M. Shapiro

Department of Zoology, University of California, Davis, California 95616

**Abstract.** A new record of *Vanessa virginiensis* "ab. *ahwashtee*" is presented from Nevada County, California. The occurrence and biological significance of this and related aberrations in *Vanessa* are reviewed.

The study of aberrant wing-patterns in butterflies is currently undergoing a mild renaissance, after being cast into disrepute for decades by the nomenclatorial excesses of some European workers. Although treated by Field (1971) with disdain, the "elymi" series of aberrations in the genus *Vanessa* hold great biological interest because parallel and probably homologous aberrant phenotypes occur repeatedly in at least five species, belonging to two subgenera. They probably represent the classic phenocopy situation, in which the same aberrant phenotype may be produced by a mutant gene in normal environments, or by abnormal environments acting on a normal genotype (Shapiro, 1976). Aberrations of this series have received names (of no standing in formal zoological nomenclature) in *V. cardui* L., *V. atalanta* L., *V. annabella* Field, and *V. virginiensis* Drury. They also occur in the South American *V. carye* Hbn. *sens. str.* (J. Herrera, personal communication).

The "letcheri - muelleri" aberrations of the "elymi" series are readily inducible in *V. annabella* by cold shock applied to the pupa (Dimock, 1968; Shapiro, 1976 and unpublished). "Elymi" itself is more difficult to induce in *V. cardui*, and most specimens are only moderately modified by cold (Shapiro, 1975). The corresponding phenotype "*ahwashtee*" has not been induced in *V. virginiensis* in over 100 trials with cold shock since 1972 (Shapiro, unpublished). Both this species and *V. atalanta* seem better buffered against cold shock than the others, though European workers have successfully manipulated *V. atalanta* with both heat and cold.

On 28 June 1981 a fresh, perfect male *V. virginiensis* "ab. *ahwashtee*" was collected by the author at Lang Crossing of the South Yuba River, Nevada County, California, on the west slope of the Sierra Nevada at about 1500 m. Two normal individuals were seen in the same clump of flowering *Agastache nepetoides* (Labiatae). The capture was verified at the scene by Mr. Marc Minno and Ms. Jennie Dusheck. The specimen (Figs. 1, 2) is very similar to the original "*ahwashtee*" figured by Comstock (1927,



Fig. 1. Dorsal surfaces of *Vanessa*. Upper right: bred *V. virginiensis*, normal. Upper left: *V. virginiensis* ab. "ahwashtee", Sierra Nevada, CA, 28 June 198. Lower right: *V. cardui*, "elymi"-like aberration induced by pupal chilling. Lower left: *V. annabella*, "muelleri"-like aberration induced by pupal chilling.

Fig. 2. Same, ventral surfaces.

pl. 42, fig. 6). The bibliographic history of this name is traced by Field (1971, p. 48). I have been unable to locate any new records of "ahwashtee" in the past 40 years, and it is not included in recent reviews of the "elymi" series (Shapiro, 1973, 1975; Phillips, 1971). The apparent rarity of aberrations in *V. virginiensis* parallels the strong pattern canalization observed in the laboratory and does not seem to be an artifact of its more restricted distribution and localized abundance as compared to *V. annabella* and *V. carye*. It is often the commonest *Vanessa* at high elevations and I have seen several thousand California examples in the past decade without ever noting a major aberration before.

The cause—genetic or environmental—of "ahwashtee" remains problematical, but the Nevada County example coincides with unusual weather events. From 11 through 13 June 1981 there were nightly severe freezes at Lang Crossing, with lows down to  $-5^{\circ}\text{C}$  (and highs of  $15^{\circ}\text{C}$ ). These freezes were sufficient to kill much of the year's growth of two particularly sensitive plants, bracken (*Pteridium aquilinum*, Polypodiaceae) and tall knotweed (*Polygonum phytolaccaefolium*, Polygonaceae) at Lang. The weather then warmed rapidly to daily highs and lows of about  $25-27^{\circ}$  and  $7^{\circ}$ . If the 28 June animal was indeed fresh, it would probably have been a young pupa about 11 June, and the young (8-12 hr old) pupa is known to display maximum temperature sensitivity in laboratory experiments. An attempt to duplicate these conditions will be made when material becomes available.

Because the "elymi" series of aberrations holds such interest for both developmental and evolutionary biologists, new records should be published, preferably with a photograph, and female examples should be bred from whenever possible. Perhaps the study of aberrations can be resumed without the absurd multiplication of names, misrepresentation of reared as wild examples, and stamp-collector competition which removed it from biology earlier in this century; one may hope so.

### Literature Cited

- COMSTOCK, J. A., 1927. *Butterflies of California*. Author, Los Angeles, Calif. 334 pp.
- DIMOCK, T., 1968. An extreme experimental aberration of *Vanessa cardui*. *J. Lepid. Soc.* 22: 146.
- FIELD, W. D., 1971. Butterflies of the genus *Vanessa* and of the resurrected genera *Bassaris* and *Cynthia* (Lepidoptera: Nymphalidae). *Smithson. Contrib. Zool.* 84: 1-105.
- PHILLIPS, W. L., 1971. Rare aberrant forms of Utah *Cynthia*, the Painted Lady (Lepidoptera: Nymphalidae). *Great Basin Natur.* 31: 256-260.
- SHAPIRO, A. M., 1973. Recurrent aberration in *Cynthia annabella*: a review with four new records (Lepidoptera: Nymphalidae). *Pan-Pac. Entomol.* 49: 289-293.
- \_\_\_\_\_, 1975. Natural and laboratory occurrence of "elymi" phenotypes in *Cynthia cardui* (Lepidoptera: Nymphalidae). *J. Res. Lepid.* 13: 57-62.
- \_\_\_\_\_, 1976. Seasonal polyphenism. *Evol. Biol.* 9: 259-333.